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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/743,897 | 01/17/2001 | Russell Noble | 124-834 | 8600 |
| 23117 | 7590 | 07/23/2004 | EXAMINER | |
| NIXON & VANDERHYE, PC 1100 N GLEBE ROAD 8TH FLOOR ARLINGTON, VA 22201-4714 | | | TUGBANG, ANTHONY D | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 3729 | |

DATE MAILED: 07/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

09/743,897

Applicant(s)

NOBLE ET AL.

Examiner

A. Dexter Tugbang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 May 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. The Applicant's amendment filed on 5/5/04 has been fully considered and made of record.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. The rejections below are maintained and hereby repeated below for the applicant's convenience.

Claim Rejections - 35 USC § 102

4. Claims 16-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Welbourn et al 5,262,000.

Welbourn discloses a method comprising: applying a sacrificial material 4 (in Fig. 4) to a substrate 1 of semiconductor material of silicon; applying a polymer coating (polysilicon layer 7) over part of the sacrificial material and the substrate (see Fig. 4); removing the sacrificial material 4 to leave a portion of the polymer coating defining a movable member (in Fig. 5) where the movable member defines a single cavity 13 (in Fig. 6) and in which the polymer coating is applied in a mobile state by CVD deposition to a thickness of 2 μm (see col. 4, lines 18-20).

Regarding Claim(s) 17, the polymer coating 7 is applied over substantially all of top surface of the sacrificial material 4 and contacts the substrate around, or near, the cavity 13 (see Figs. 5 and 6).

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Regarding Claim(s) 19, the portion of the polymer coating 7 defining the movable member of Welbourn also includes additional layers 9, 10, 11, which also defines a “non-flat shape of the movable polymer member”. The sacrificial material 4 is removed after the movable polymer member has been established or formed (see sequence of Figs. 5 and 6).

Regarding Claim(s) 21, the claimed “top contact pad” is read as nitride layer 6 in which this top contact pad material is etched through a mask (passivation layer 11, see sequence of Figs. 5 and 6).

With respect to the process steps being drawn to “an ultrasonic transducer”, these limitations recited in the preamble of the claims are intended use limitations and have not been given patentable weight since the body of the claims do not depend upon the preamble for completeness and the process steps are able to stand alone. *In re Hirao*, 535 F.2d 67 190 USPQ 15 (CCPA 1976).

Claim Rejections - 35 USC § 103

5. Claims 16, 19, 22, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ella 5,714,917 in view of Nakanishi et al 4,296,349.

Ella discloses a method of producing an ultrasonic transducer comprising: applying a sacrificial material (ZnO layer 46 in Fig. 18c) to a substrate; applying a coating material (piezoelectric layer 52) over part of the sacrificial material and the substrate; and removing the sacrificial material 46 to leave a portion of the coating material defining a movable member wherein the member defines part of a single cavity (gap 62 in Fig. 19c) and the coating material is applied in a mobile state by deposition (see col. 10, lines 58+).

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Regarding Claim(s) 19, Ella removes the sacrificial material 46 after a non-flat shape of the movable member has been established (see sequences of Figs. 18c and 19c).

Regarding Claim(s) 22 and 23, Ella further teaches producing an array of transducers on the same substrate or wafer (see col. 11, lines 44+) and that each transducer responds to various or different frequencies (see col. 12, lines 22+).

Regarding Claim(s) 24, Ella further teaches that it is conventional to have the transducer provided with an integrated semiconductor device, i.e. voltage capacitor, with the signal processing means, i.e. circuitry, on the same substrate (see col. 1, lines 35-44).

In summary above, Ella teaches substantially all of the limitations of the claimed manufacturing method except that the “coating material” is applied as a polymer such that the coating material 52 can be said to be a “polymer coating”. It is noted that the coating material 52 of Ella has piezoelectric properties or is a piezoelectric material.

Nakanishi suggests that it is conventional, old, and notoriously well known in the art of manufacturing ultrasonic transducers to provide coated materials of piezoelectric properties with various types of polymers at least for the advantages of having low acoustic impedance (see col. 1, lines 10-23).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the coated material of Ella by applying the coated material with a polymer composition such that the material is a “polymer coating”, as taught by Nakanishi, to positively allow the transducer to operate with low impedance.

Response to Arguments

6. Applicant's arguments filed 5/5/04 have been fully considered but they are not persuasive.

In regards to the merits of Welbourn et al, the applicant's urge that Welbourn does not teach a "polymer coating" and thus, cannot possibly satisfy the steps of "applying...movable member" (lines 2-4 of Claim 16).

The applicant's believe that the polysilicon layer 7 of Welbourn is not a "polymer" and that one of ordinary skill in the art would not construe polysilicon as a polymer. The examiner most respectfully disagrees. Welbourn mentions that the polysilicon material is utilized as an electrode (see col. 4, lines 18-21), which is inherently a conductive polymer. To prove the examiner's point, the examiner cites Lee et al (U. S. Patent 6,165,863, at col. 7, lines 24-29) and Zellner et al (U. S. Patent 6,078,537, at col. 1, lines 33-35) as evidence that polysilicon is, in fact, a conductive polymer. The term "polymer", as claimed, does not exclude the polymer from being any type of conductive polymer.

In regards to the merits of Ella, the applicant's believe that Ella does not apply anything in "a mobile state". The examiner again, most respectfully disagrees. In "a mobile state" is a very broad limitation and any deposition, inclusive of the sputter deposition of Ella, would meet that limitation because deposition is a form of coating that requires the material to be moved, or deposited, which is in a "mobile state".

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., any subsequent polymerization) are not recited in the rejected claim(s). Although the claims are

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interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, both Ella and Nakanishi each share the application of deposited materials having piezoelectric properties as the examiner has stated this in the above rejection. Nakanishi shows that piezoelectric materials with a "polymer" composition solves the problems of impedance and therefore, to use the polymer materials of Nakanishi in Ella would be obvious to solve the common problems shared by both with piezoelectric properties.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

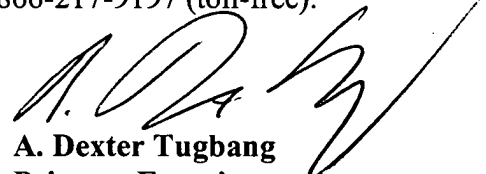
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the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to A. Dexter Tugbang whose telephone number is 703-308-7599. The examiner can normally be reached on Monday - Friday 7:00 am - 3:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on 703-308-1789. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


A. Dexter Tugbang
Primary Examiner
Art Unit 3729

July 22, 2004